ANNUAL REPORT

OF

THE DIRECTOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

TO THE

PRESIDENT OF HARVARD COLLEGE

FOR

1936-1937

CAMBRIDGE, U. S. A.:
PRINTED FOR THE MUSEUM
1937

PUBLICATIONS

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

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The BULLETIN and MEMOIRS are devoted to the publication of original work by the Officers of the Museum, of investigations carried on by students and others in the different Laboratories of Natural History, and of work by specialists based upon the Museum Collections and Exploration.

These publications are issued in numbers at irregular intervals. Each number of the Bulletin and of the Memoirs is sold separately. A price list of the publications of the Museum will be sent on application to the Director of the Museum of Comparative Zoölogy, Cambridge, Massachusetts.

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REGINALD ALDWORTH DALY	*Sturgis Hooper Professor of Geology*

REPORT OF THE DIRECTOR

1936–1937

To the President of Harvard College:

Sir: —

Another noteworthy year has passed in the history of the Museum.

I must report, first, the loss of two members of the Staff. Frederick H. Kennard, a vigorous, loyal and devoted friend of the Museum for many years, died February 24, 1937. An account of his life, written by his colleague, Arthur C. Bent, appeared in the *Auk*, July 1937, Vol. 54, no. 3, p. 341.

On April 19, William Morton Wheeler died suddenly in the subway station at Harvard Square; the most distinguished entomologist of his time and a naturalist whose interest in every branch of biology and whose devoted and affectionate friendship will never be forgotten by anyone who knew him. An account of his life appeared in *Science*, June 3, 1937, Vol. 85, no. 2214, pp. 533–535, by several of his intimate admirers.

The Tercentenary Celebration brought a number of distinguished visitors to the Museum, some for short visits, others for longer periods of study. Their presence was of great assistance in discussing many knotty problems and a source of inspiration to the Staff. Among these may be mentioned particularly Professor H. Boschma, Director of the Royal Natural History Museum at Leiden; Professor Filippo Silvestri, Professor of Entomology of the Agricultural Institute at Portici, Italy; Professor Johan Hjort of Oslo; Professor William Berryman Scott of Princeton; Professor H. Speemann of Freiburg i. B., Germany; Professor August Krogh of Copenhagen; Professor Frank R. Lillie, University of Chicago; Professor Andrew Cowper Lawson of the University of California; Doctor Lewis Hill Weed of Johns Hopkins University and Professor Edward Hindle of the University of Glasgow, Scotland. In anticipation of the probable interest of such visitors in the Museum, a handbook concerning the scientific resources of the Museum and a history of its collections and a description of the public exhibits was prepared and distributed to them.

The public has continued to frequent the Museum in greatly increased number. The guide service available before and during the Celebration proved very popular and the increase in the number of visitors has been marked throughout this year as well. That many visitors really appreciate what they see and that they observe sharply is indicated by the promptness with which reports are made of the occasional slips and errors which occur in descriptive labels on exhibits which have sometimes to be, perforce, hastily prepared.

One of the most popular of our exhibits has been that showing the diversified nesting habits of birds, the curiously complicated nest building of some of the exotic species being a constant source of wonder to visitors. This prompted the preparation of a rather extensive display, illustrating insect architecture and while this may well be amplified in future, a most attractive and instructive beginning has been made. Happily, while setting up this installation it was still possible to have Professor Wheeler's advice and help. He heartily approved of the scheme.

Professor George H. Parker generously gave us his collection of prints and photographic portraits of naturalists and this prompted the revision and filing, according to a modern system, of the enormous collections already in the Museum, so that I believe that the collection as it stands now is certainly one of the largest, if not the most extensive in existence. In connection with this the letter files have been reorganized and a tremendous mass of manuscript material thus made accessible. These files are in constant use in identifying the handwriting of original labels and field notes and will be forever a priceless adjunct to the collections. A good beginning has also been made in arranging and filing the Museum's accumulation of original sketches and drawings, many hundreds of which were made for Professor Louis Agassiz but never used. These represent years of work by such distinguished zoölogical artists as Roetter, Burckhardt, Konopicky, Blake, Westergren, Fischer, as well as Alexander Agassiz and Louis Agassiz themselves and a host of others. Within a month these have been drawn on abundantly to illustrate a recent textbook and I am sure they will be widely called for in future, now that they are accessibly arranged for the first time.

The endless task of relabelling the exhibition collections has been continued and the Synoptic Room has been completed, Doctor Deichmann having taken great pains helping with the long descriptive labels of the groups of lower invertebrates. Work on the fossil fishes and reptiles has begun and new labels for these are now in press. Changes have been made in the arrangement of some of the large vertebrate fossils which will make possible more advantageous display. The Mastodon has been moved to a place next the front door on Divinity Avenue and the portraits of the elder and younger Agassiz have been placed on each side of the door and other portraits hung along the stairway. This has made room for more of Mr. Nelson's beautiful mounted fossil reptiles and improved the appearance of the entry very greatly.

At this point I should mention, since it *is* nearly completed, that the finest Pelycosaur hitherto mounted, an example of Edaphosaurus, has been so nearly finished by Mr. Nelson that there is no reason why it should not be mentioned in this report. It will face the splendid Dimetrodon put on exhibition last year. At least two other fine Pelycosaurs remain to be mounted as well as the Coryphodon which I got some years ago from Doctor Troxell of Trinity College. This skeleton was complete but badly crushed, the skull having been completely flattened. It has been picked apart and reassembled by Nelson with consummate skill and will be very instructive when finally mounted.

In as much as, unfortunately, it is only the Director's report which is reprinted in the Annual Report of the University, I cannot refrain from saying a word concerning one or two matters which are more completely covered in the reports of the several curators. This I have done and wish to add a word concerning the great satisfaction which the Museum feels at being chosen as the permanent land headquarters of the International Ice Patrol. The officers in charge of the Patrol have been chosen not only because they were fearless and self reliant but because they were able scientists and their presence has been a stimulating influence to the oceanographers of the Museum. That we have them here at all is, naturally, thanks to Doctor Bigelow.

I do not know why it did not occur to me before that the Museum had a literary resource of great value in the journals which Mr.

William Brewster bequeathed to the Museum. Their contents, of course, were known and many of us had dipped from time to time into them so that we never forgot their charm and beauty. It was not, however, until the Reverend Smith Owen Dexter retired from his rectory at Concord that anyone really had abundant time to examine the many volumes of manuscript with the care which they deserved. Mr. Dexter died before his task was completed but he made a start which led to the appearance of "October Farm" now in its second printing and of "Concord River" which has just appeared. I have spent much time in editorial work connected with the appearance of these books as well as with a posthumous work by Professor Wheeler. However these tasks have been labors of love since they have served to keep fresh the memories of distinguished servants of the University as well as dear friends.

I have called attention, in past reports, to the difficulty which we have had in publishing the results of investigations by members of the Staff with our inadequate funds. It is, therefore, with great pleasure and deep appreciation that I report a generous gift by Mr. George R. Agassiz for purposes of publication with the promise that such aid will continue if possible. I can think of nothing which has been a greater source of inspiration to my colleagues than the knowledge that their papers might not have to wait perhaps several years before they could be printed.

The year has been noteworthy in the results of a number of Museum expeditions. I spoke in the last report of the work of Messrs. Price and White in Brazil. Their magnificent collections of fossil vertebrates are now here and partially unpacked. The matrix in which many of the skeletons are enclosed is refractory in the extreme but mechanical methods are being developed which, with the aid of grants from the Milton Fund, will soon give much more definite information as to just what we really have. One beautiful skull of a Rhynchosaur has been put on exhibition — the first to be seen in any North American museum, and by far the most perfect of its kind ever obtained. This is shown alongside of its sole surviving ally in the shape of a skull of the almost extinct Sphenodon of New Zealand. Skulls of Cynodonts and Dicynodonts will shortly be ready for study and display. The University owes a deep debt of gratitude of the innumerable officials representing the

Brazilian scientific services and museums which rendered the most wholehearted and generous assistance to the expedition. These have been officially thanked individually by vote of the Faculty of the Museum.

Miss Barbara Lawrence, on her own initiative and at her own expense, has volunteered to make collections in some of the most difficult and inaccessible parts of the Philippine Islands and Sumatra and the collections already received are a monument to her indomitable energy and skill in the field as well as in the laboratory.

The Asiatic Primate Expedition, organized by Harold J. Coolidge, with financial assistance from a number of different sources, has already returned extensive collections from Siam. Coolidge had the assistance of Professor Adolf Schultz of Johns Hopkins as well as Mr. Sherwood Washburn, a Sheldon Travelling Fellow, and Mr. August A. Griswold, Jr. of the Museum Staff, while the sociological aspects of the study of the primates of southeastern Asia was in the competent hands of Professor Ray Carpenter of Bard College. After their successful sojourn in Siam they went to Borneo but details concerning the work in this region had best wait for next year's report as the collections have not been received and the members of the Expedition are still abroad.

I am also inclined to defer details concerning the expedition to Santo Domingo, in charge of Mr. William J. Clench, assisted by Messrs. Henry D. Russell and Richard A. McLean. Reports indicate most generous treatment by the Government of President Trujillo who waived the custom duties and other charges, offered the facilities of the Rural Guard and Coast Guard forces so that travel in the remote parts of the country was greatly facilitated. The letters received indicate collections which will throw a lot of new light on one of the least known areas in the West Indies, the mountain ranges of northeastern Santo Domingo.

Under Professor Romer's general direction a number of his assistants have continued searching for Permian reptiles in Texas and New Mexico so that the collections from this region now at our disposal are as complete as any and are now being of great use in connection with his monograph of the Pelycosaurs which may reasonably be expected to be complete within the next year.

Mr. Henry Seton and Mr. Robert Denison generously continued work in the Wind River Basin, securing mammalian fossils, fragmentary to be sure as was to be expected from this horizon, hitherto very badly represented in our collections.

With the consent of Professor Loomis of Amherst, granted just before his lamented death, Messrs. Price, White, Olsen and Witter secured several hundred fossil fishes from the classic locality in Sunderland, Massachusetts, while other Triassic fishes were gotten in Durham, Connecticut.

I was absent during part of the winter visiting colleagues and universities throughout the southern States and arranged a number of exchanges of both men and material. I was able to get a few good fossils from the phosphate beds in Florida and made the usual visit to the laboratory and garden at Soledad, Cuba. Early this summer, with my family, I went to Gaspé and got some good fossil plants as well as some fish, Ostracoderms, and some corals and other invertebrates, the latter from a classic locality near Dalhousie from which we previously had nothing.

A complete reorganization of the direction of our library was made necessary by the resignation of Mrs. Peters for reasons of health, after many years of wise and skilful charge of our books. At almost the same time Miss Dorothy Howes was also forced to resign and general charge of the library has now been turned over to Mr. William E. Schevill who, fortunately for the Museum, has a decided taste for bibliography and is a skilful and discerning collector. With the approval of the Corporation we are allowed to increase a considerable deficit in the budget item normally assigned to binding as many of our series were going to pieces with use, pages, plates and maps being lost and many valuable sets endangered. We are now binding these as fast as they can be prepared for the bindery.

I have often thought of what Mr. Eliot said in his Essay on the Aims of Higher Education. He wrote in 1898 these words, "The Museums of a great university are crowded with objects of the most wonderful beauty — beauty of form and beauty of color, as in birds, butterflies, flowers and minerals. They teach classification, succession, transmutation, growth and evolution; but they teach also the abounding beauty and loveliness of creation." I have often

felt the stimulus of the beauty of things with which it is my privilege to be associated so intimately. I believe it is this feeling which stimulates the members of our Staff to productivity and hard work in the absence of much material reward. The function of a Museum has, I think, never been better stated than by Sir Henry Miers who said in a report to the Trustees of the Carnegie United Kingdom Trust that it "is by means of exhibited objects to instruct, and to inspire with a desire for knowledge, children and adults alike; to stimulate not only a keener appreciation of past history and present activities, but also a clearer vision of the potentialities of the future. They should stir the interest and excite the imagination of the ordinary visitor, and also be for the specialist and the student the fruitful field for research."

REPORT ON MARINE INVERTEBRATES

By Hubert Lyman Clark

The opening of the year found the curator at the Hopkins Marine Station, Pacific Grove, California where considerable material was accumulated either as gifts from the station or by collecting. Returning to Cambridge in September, the identification of this material occupied much of my time for several weeks. The following months have been devoted to the study of a large and notable collection of brittle-stars from the northwestern part of the Indian Ocean, made by the "John Murray" Expedition in 1934, and belonging to the British Museum. In return for the preparation of this report the Museum of Comparative Zoölogy will receive an important series of specimens from a region at present scarcely represented here. The end of the year finds this study completed and the writing of the report under way.

From November first until the end of May, Mr. Fred C. Ziesenhenne, of the University of Southern California, was working on our Echinoderms, as Virginia Barret Gibbs Scholar, under the curator's guidance. Unusually industrious and faithful in his work, completely open-minded, endowed with more than ordinary good judgment, patient and careful without being slow, Mr. Ziesenhenne accomplished a surprisingly large amount of good work. A permanent result is his forthcoming report on the Echinoderms of the Templeton Crocker Expedition to the waters around Lower California. The vessel involved was the "Zaca" and the collections made were of considerable extent and of great interest. Thanks to the kind generosity of Mr. William Beebe, Director of the Expedition, the Zaca collection of echinoderms has been presented to the Museum of Comparative Zoölogy and is a very valuable addition, including several species not hitherto represented.

The month of April was spent by the curator in Coral Gables, Florida, working by invitation of Professor Jay F. W. Pearson with his unique class in marine zoölogy at the University of Miami. This class, admirably directed and handled by Professor Pearson,

its originator, works through the spring term of the university in the waters of Biscayne Bay and the adjoining keys, by means of diving bells, dredges and shore collecting. No better method of introducing young students to the marvels of marine life could be devised and anyone aspiring to work in the field of marine zoölogy ought to take such a course. Thanks to the generosity of Dr. Pearson and the cordial cooperation and active assistance of Mr. John W. Mills, the long-time engineer of the Carnegie Institution's laboratory at the Tortugas, whose home is in Miami, the curator was enabled to bring back to Cambridge a large and valuable collection of echinoderms in return for his six weeks absence.

For several years past it has been the lot of the curator to be called on for assistance by palaeontologists in connection with fossil echini. The importance of comparing these with recent species is obvious and often very great, and the curator can thus serve his palaeontological colleagues in a worth-while way. Three years ago much time was given to the study of an important series of fossil echini from Fiji and a report was prepared for publication but owing to conditions over which neither the Museum nor the curator have any control the publication is still deferred. During the past year, two brief reports, involving the description and naming of new forms, have been prepared, one for the Alabama Geological Survey and one for Professor Hubert G. Schenck of Stanford University. The former was very promptly published, the latter is in press.

The collaboration of Mrs. Karl M. Pattee in the labelling and cataloging of the extensive accessions of the year, 3792 specimens, has made it possible for all of them to be incorporated in the collection. But Mrs. Pattee's industry brought to a head the overcrowding of the small card catalogue cabinet with which the card-cataloging began over 30 years ago. In consequence, work has been started on a new catalogue of modern style, with steel cases and large cards; and good progress has been made by Mrs. Pattee on the entering of the ophiurans. Mrs. Pattee has now become so familiar with the details of cataloging, including the designations for type material, and with the keeping of the record of accessions, her skill and industry have made her invaluable and warrant offering her this word of thanks. It would be invidious and ungracious

too, if I did not also express my deep obligation to my colleagues and assistants in the department, Dr. Deichmann and Dr. Chace for their willing and cheerful coöperation and assistance in every possible way.

The accessions of the year are from an unusually large number of sources. The California collection of the curator included 619 specimens of some 50 species, and that from Florida, 725 specimens of 56 species. The "Zaca" collection gave us 2158 specimens of 65 species but about two thousand of them represented a single very common brittle-star. Exchanges with Amsterdam and Stockholm brought us 15 holothuriana, needed in Dr. Deichmann's work. Important gifts of a dozen or more specimens came from Feng-Ying Chang, R. T. Jackson, G. E. MacGinitie, James Miller, C. M. Pomerat, L. Howell Rivero, W. C. Schroeder and Melbourne Ward. Mr. W. J. Clench and his assistants in the Department of Mollusks, Messrs. Cheever, McLean, Russell *et al.* have donated many specimens. Other donors are Roland H. Alden, Rolf Bolin, E. Deichmann, R. Foster, A. G. Glassell, P. de Mesa, T. Mortensen, P. T. Putnam, W. E. Schevill, L. H. Snyder, W. N. Southern, D. Villadolid, J. F. G. Wheeler and F. C. Ziesenhenne. To all of these helpful friends the thanks of the department are cordially tendered.

REPORT ON OCEANOGRAPHY

By Henry B. Bigelow

The oceanographic activities of the Museum have been chiefly in coöperation with the Woods Hole Oceanographic Institution.

In October Mr. Stetson, with C. S. Piggot, made a cruise on "Atlantis" on which several long cores were secured from the deeper parts of the continental slope. The work is being continued this summer and it is hoped that cores from the ocean basin itself will be obtained. Due to assistance from the Milton Fund we now have our own coring tubes, and it is no longer necessary to borrow one from the Geophysical Laboratory. This investigation is a continuation of the study resulting from the line of cores secured by Dr. Piggot across the North Atlantic, and which is yielding such surprising information about the Pleistocene history of that basin. In coöperation with Dr. J. A. Cushman, who is handling the foraminifera from the Piggot cores, two of his former students, Dr. Phleger and Miss Parker, are working at Woods Hole on the foraminifera from the slope cores. All other work on the slope cores is nearly complete.

The cores brought back by the 2d Byrd Antarctic Expedition from the Ross Sea were worked up and the report is now in press, and a paper on the current measurements made last summer in the Georges Bank canyons was published. Laboratory experiments were carried out on the behavior of suspension currents recently proposed by Professor Daly as a possible means for cutting submarine canyons. A report is at present in press.

Late in October, Mr. Iselin returned from Europe after attending the Edinburgh Assembly of the International Union of Geodesy and Geophysics. At this meeting it was agreed that if possible in the late spring of 1938 ships would be sent from at least five countries to explore intensively, both from the meteorological and oceanographical standpoints, the mid-ocean area east of the Grand Banks. In February he went to Guantanamo, Cuba, where for two weeks the "Atlantis" worked with the Destroyer "Semmes" of the

U. S. Navy's Experimental Division. He visited the Bermuda Biological Station in April to work out some of the details of the new coöperative investigation of the long period fluctuations in the circulation of the North Atlantic.

This undertaking originated at the suggestion of a committee of the Royal Society, a generous grant of money having been secured from the British Government to provide personnel and equipment for the Bermuda laboratory. It is planned that in co-operation with the Woods Hole Oceanographic Institution a five year study will be made of the changes in volume of the Gulf Stream and also of the fluctuations in surface temperature resulting from the variations of the winds over the ocean. Actual work at sea in connection with this project began in June and until the new Bermuda boat is ready, the "Atlantis" will continue to make the necessary periodic observations.

To emphasize further the increased progress and scope of physical oceanography during the past year, one more coöperative project might be mentioned. Because of a grant made by the Geological Society of America, Dr. Maurice Ewing has been able to redesign his submarine seismic equipment. In July he made a short cruise on the "Atlantis" to test out explosives in deep water and it is hoped that by September it will be possible to undertake the first measurements of the thickness of the unconsolidated sediments covering the floor of the ocean basins.

The Museum's connection with these various new investigations is by no means as indirect as it might at first seem, for not only are several members of its staff taking an active part in the field work, but also a good share of the ideas and background originated here.

The study of codfish migrations and populations was continued by Mr. William C. Schroeder, based on material collected from 1924 to 1932. The cod temperature-growth experiment was finally given a successful start in May, 1937.

As in past years, Lt. G. Van A. Graves, Ice Observation Officer of the International Ice Patrol Service, was stationed at the Museum during the autumn and winter engaged on his report of the Ice Patrol for the last season. He went to sea in February when the drifting bergs began to menace the North Atlantic steamship lanes, and returned from the Patrol in June. He was in command

of the post season oceanographic cruise which occupied six sections crossing the Laborador-Arctic current water from the tail of the Grand Banks to about 55° Lat. N. He returned about July 25th.

Most of my own available time during the year was spent on a report on medusae collected by Dr. Beebe in the vicinity of Bermuda in 1929 and 1930. This is now in press. A report on the siphonophores of the "Thor" expedition was published, and the collection has been returned, a duplicate series being retained for the Museum.

The sorting of the siphonophores of the "Dana" expedition, mentioned in my last report, was continued in Copenhagen during the year. An unusually large shipment was received at the Museum in November, and the sorting will probably be completed during the coming autumn. Dr. Sears devoted most of the summer to her report on the plankton of the continental slope which now nears completion. In July 1 attended the meeting of the International Council for the Exploration of the Sea, in Copenhagen. Mr. Iselin was appointed Acting Director of the Oceanographic Institution during the summer.

REPORT ON ENTOMOLOGY

By Nathan Banks

No language can express the loss to this Department in the death of Doctor Wheeler; his personality, his presence, his spirit was a benediction to all of us. For many years we shall feel his influence, a pervading and encouraging memory.

Accessions: The gift by the children of the late Frederic Allen Eddy of Bangor, Maine, of their father's collection was the principal addition during the year. Mr. Eddy had purchased the A. S. Fuller collection of Coleoptera, a noted collection, fifty years ago, and added to it by purchase and collecting. He also acquired a fine lot of Lepidoptera, foreign as well as from the United States, all except the duplicates most carefully prepared. Many of the native forms came from G. R. Pilate, a professional collector of a former generation, whose material was scarcely represented in our collections.

The foreign material, both butterflies and moths, was purchased from well-known dealers, and represented all countries.

Besides there is a considerable number representing other groups of insects.

By the wish of his children most of the insects from Maine will go to the University of Maine, the Museum selecting what it desires. Altogether over 60,000 specimens have been added to our collections, with hundreds of species not previously represented. Over 200 of Mr. Eddy's boxes are the same size as our own. The Eddy collection is thus one of the most valuable we have received in many years.

Doctor Darlington presented over 10,000 Coleoptera of his collection, and obtained during his five months in Cuba fully as many more of all orders. Particularly valuable are those from the eastern mountains, many of these are new species.

Doctor Bequaert gave us over 1200, Hymenoptera and Diptera from the United States, mostly named, over 600 African specimens (mostly Hymenoptera), 40 Bombus from Lappland, 80 Ecuadorian

Hymenoptera, and from his Colombian trip we received about 2800 miscellaneous insects and spiders. Mr. H. Loomis gave us some named myriopods, among them several paratypes. Messrs. Carpenter, Brues and Parsons, on their Canadian trip for amber insects, collected over 300 specimens of living forms. Dr. D. Davenport presented various butterflies, several new to our collection, principally Satyridae.

For other gifts we thank B. P. Clark for 100 rare Sphingidae, G. Englehard for 60 Western Hymenoptera, T. D. A. Cockerell for 10 named bees, R. Dow for 40 Cuban insects, E. M. David and C. H. Paige for Florida insects, H. B. Mills for some Gryllotalpa, Miss E. Bryant for S. Carolina insects and spiders. Dr. W. M. Wheeler for several hundred miscellaneous insects, Messrs. C. A. Frost, J. Carabia, D. Davenport, C. T. Parsons, M. C. Lane, J. G. Myers, C. T. Ramsden and N. A. Weber for various Coleoptera, and H. K. Wallace, W. J. Gertsch, E. Fichter, E. Sanders, Miss M. D. Porter and M. E. Clark for various spiders, and about 200 vials of Texas spiders from Miss S. Jones. As usual duplicates from collections sent for naming were retained whenever desirable. The Curator added 1000 local insects.

By exchange we obtained from Walter Horn, European and Oriental Diptera and Coleoptera; from H. B. Leech miscellaneous Canadian Coleoptera; from Ward's Natural Science Establishment about 150 Carabidae; from G. E. Bohart 200 Californian Hymenoptera and Diptera; smaller lots of beetles from F. Van Emden, C. H. Lindreth, S. T. Danforth, R. Hopping, M. Banninger, and the U. S. National Museum and the American Museum of Natural History.

By purchase from J. L. Gressitt 780 Neuroptera and Hymenoptera and about 3000 Arachnida, all from South China. From P. Susai Nathan 2000 Neuroptera, Diptera, Hymenoptera and Carabidae from South India. From F. Schade, about 300 Neuroptera from Paraguay. From the Pacific Coast Biological Survey 60 Carabidae, and a small lot of Carabidae from Staudinger and Bang-Haas.

Material studied: Dr. Wheeler worked almost to the hour of his death identifying and describing Formicidae from all parts of the world. Miss Bryant has continued work on Arizona spiders, and on

parts of those collected by Doctor Darlington in Cuba. Doctor Darlington has described various novelties in his Cuban material. Mr. F. Hull has published on some of our Syrphidae, Mr. Maurice James identified our South American Stratiomyidae, and Professor F. D. Funkhouser named our numerous Central and South American Membracidae. M. A. Théry has studied more of our Old World Buprestidae, and described the new species. Mr. G. Ochs has named the Antillean Gyrinidae, and Messrs. Hinton, Banninger, Taylor, Zimmerman, and Mrs. Doris Blake and Miss E. Mank have also helped in the Coleoptera.

The New Guinea Heterocera were sent to Dr. Karl Jordan, and the Barro Colorado Nolodontidae to Dr. W. T. Forbes. Some of the Cuban and Haitian Orthoptera have been published by Mr. J. A. G. Rehn. The Curator has identified and described a considerable number of Oriental and Antillean Neuroptera and Psammocharidae, and prepared various papers thereon.

Arrangement: Following the labelling by a student, the Curator transferred the Eddy Lepidoptera that were in unsafe boxes to our drawers, and put all in the geographic arrangement. The various new collections (except Lepidoptera and Coleoptera) were mounted, labelled, and assorted to groups. Parts of the exotic Hymenoptera were better arranged; the Cuban Cicadellidea identified and arranged, and various boxes of the Asiatic Neuroptera were rearranged to include the new material. Several thousands of species labels have been written and placed on the specimens. Dr. Darlington has mounted and arranged the Coleoptera taken on his Cuban trip, and also arranged the Asiatic Carabidae (occupying now over six boxes); he has straightened out the Blanchard collection, numbered the boxes and prepared a family index; parts of the native Elateridae were also arranged, and the Buprestidae of the Old World identified by Mons. Théry. Miss Bartlett continued to assist Dr. Wheeler, and after his death has done most of the work on his collection; she also spread a considerable number of exotic Lepidoptera, mostly Sumatran.

The Wheeler Ant Collection: After the death of Dr. Wheeler the numerous boxes of ants in his office were brought to the Museum, and Miss Bartlett began getting the 100,000 or more pinned specimens in order. The materials belonging to other Museums and

persons and loaned to Dr. Wheeler for study were separated and most of these are already returned to their owners. Then the unmarked types in the arranged collection were numbered, and after that named species in the miscellaneous material inserted in the arranged collection. Several genera of his arranged collection never had been transferred to our drawers; these will take about eight more boxes.

There is still an enormous amount of unnamed material, now arranged geographically. Some of these were put in genera by Dr. Wheeler, and often indicated as new species. These will have to be added to our arranged collection.

Besides all the above are several thousand vials of alcoholic ants, partly named to genera.

Other help: Three students helped during the year; one in spreading and labelling Lepidoptera, the others mostly labelling the Eddy collection, and in fumigating the collections. Besides these Miss Bartlett was continued and S. Williams spent a month helping on the Coleoptera, and Fred Solano worked during the year preparing Coleoptera.

Equipment: Fifty new boxes were added during the year. The continued shortage of our standard boxes makes it necessary to consider the use of Schmitt boxes, of which we have a number, for permanent storage of our rapidly increasing collection. The two hundred Eddy boxes and three cabinets (holding 90 boxes) have helped somewhat. Adequate equipment is by far our most important problem.

Visitors: There was a large increase in visitors. Dr. J. W. Chapman spent several weeks studying Philippine ants, and Dr. N. A. Weber also several weeks identifying Trinidad ants. Professor Chickering worked for three weeks on Barro Colorado spiders. Doctor H. Ross spent nearly a month examining American Trichoptera. Mr. J. G. Clarke was here over a week comparing Lepidoptera. Mr. M. C. Lane much of the time for a month studying certain genera of Elateridae. Mr. H. Dietrich and E. D. Quirsfeld also examined Elateridae. The late C. R. Crosby spent a week studying spiders; Mr. H. R. Wallace, Doctor B. J. Kaston and Miss Sarah Jones also came to examine spiders. Doctor P. Babiy came to study Psammocharidae, Doctor A. B. Klots to

study Crambus, Mr. J. A. G. Rehn and his son to study Orthoptera, and Doctor V. L. Pate, Oxybelus. A new feature was the visits of students of other colleges. From the University of California came E. Gordon Linsley, Coleoptera, C. D. Michener, bees, and R. E. Usinger, Hemiptera. From the Massachusetts State College came G. E. Nettleton, Braconidae, H. Pratt, Ichneumonidae, J. Hanson, Perlidae, and P. C. Stone, Pentatomidae. From the University of Minnesota came D. Murray, Sphex, D. Denning, Trichoptera, G. Tilford, Syrphidae and R. H. Daggy Hymenoptera.

Loans: Several loans that have been out for a number of years were returned, and many of the loans during the year were also returned, but there is still several thousand specimens on loan.

Types: Over six hundred types were added, the number marked now being 22,990.

REPORT ON MAMMALS

By G. M. Allen

Of outstanding interest for the department this year is the field work being carried on by our two expeditions to the Far East. Miss Lawrence, on her own initiative, has spent the past winter collecting in the Philippine Islands, a region from which we had practically nothing in the way of modern material of small mammals. As a result of her work there she has sent back a splendid series of well-prepared specimens, among them several of the rarer endemic genera that we have greatly wanted. Much credit is due her for having so successfully carried out her mission, in the course of which she has shown great tact and resourcefulness. The "Asiatic Primate Expedition" was organized last year by Mr. Coolidge, primarily to make field studies and to secure anatomical material of various primates in Siam, Borneo and Sumatra. Mr. J. A. Griswold, Jr., and Mr. Sherwood Washburn were among the members of the party and may confidently be expected to add much to the collections of mammals. Already the latter has sent back an excellent series representing five forms of monkeys collected in Ceylon on his way eastward.

The Curator has carried on the usual routine work of the department. Over eight hundred specimens have been catalogued, in which Mrs. Andrew Marshall, Jr., has on several occasions generously given assistance. Over sixty of the larger skins have been tanned. The storage room for tanned hides has been disinfected for insect pests and a new ventilating fan has been installed to prevent the air in the room from becoming overheated or overdried in summer, and seems to be working effectively.

During the year, several visiting investigators have spent longer or shorter times consulting the collection and the Curator has had frequent opportunity to assist those seeking information or the identification of specimens. Several graduate students have made use of the collection in their studies. Loans have been made to three institutions. With the aid of a student assistant, Mr. Coyle,

during part of the year, much relabelling of trays containing study material has been accomplished so that desired specimens may be readily found, and a notebook has been prepared as a key to the collection, so that one not familiar with its arrangement may without difficulty locate the various genera.

Important additions through purchase are: a skin and skeleton of the Giant Panda; a collection of small mammals from South West Africa; a small series from Austria; the skull of a Cotton's White Rhinoceros; a collection of skulls and skeletons of Gorilla and Chimpanzee from the Cameroons; and a collection, with notes, of samples of ambergris from J. Henry Blake. More than a dozen exchanges for desirable material have been carried out, notably with the following: Leiden Museum for specimens of the two genera of Celebes apes and a skull of the Sumatra Elephant; Bâle Museum and the Indian Museum for eastern bats; Carnegie Museum for South American and African species; Field Museum of Natural History; State Museum of North Carolina for topotypes of the southern race of beaver; and with William B. Davis for western mammals, John W. Hayden for various specimens from the Yukon, and Dr. N. Kuroda for a welcome series of Japanese species.

For many specimens received by gift, grateful acknowledgment is made to the following: Miss Mary Ogden Abbott, for skins and skulls of ungulates collected by her in Kashmir; Academy of Sciences, Leningrad, for a specimen of Aschizomys; the South African Museum for a skin and skull of the Bontebok from the herd preserved at Zeekoevlei; Andover Theological School for Palestine mammals in its former museum; Dr. Joseph Bequaert for bats and other specimens secured in Colombia; Edward Brooks for shell-heap bones from Nantucket; Dr. Herbert C. Clark for water opossums and pygmy anteaters from the Canal Zone; William J. Clench for a series of West Indian bats collected by members of his expedition to the Bahamas; Dr. V. J. Fewkes for a series of deer bones from neolithic sites in Bohemia; Donald R. Griffin for specimens of bats from New England; J. A. Griswold, Jr., for four foxes from Switzerland; Dr. H. Heckenbleichner for bats sent from North Carolina; John K. Howard for samples of elephant leather and rhino hide; George Kennedy for specimens of the dwarf rabbit, Brachylagus; James C. McNaughton for a fine skull with horns of a

Cape Buffalo and a pair of kudu horns; Leonard R. Muller for a walrus tusk from Nova Scotia; Charles T. Parsons for four small mammals from Manitoba; Dr. John C. Phillips for a magnificent skin and skull of the wild Reindeer of Norway; Sir Douglas N. Reid, Bart., for a Scottish wildcat; Mrs. Dean Sage for three gorals from China collected by herself and her husband; George Schwab for three fine leopard skulls and a skin of the white-nosed monkey from the Cameroons; Mr. J. H. Stabler for a set of horns of the Barbary Sheep and skull of a small gazelle; C. J. Van der Horst for specimens of the elephant shrew from the Transvaal; W. F. Walker for a series of the rare bat, Platalina, from Peru; Sherwood Washburn for the series of primates, already mentioned, from Ceylon; Dr. Neal A. Weber for a specimen of Nectomys from British Guiana; and Dr. Theodore White for a Brazilian armadillo and to John Eliot Thayer III of Lancaster, Mass., for a pair of horns taken from an enormous Texas steer about 1875. These are now unobtainable. To the generosity of the Director is due a fine series of nearly forty specimens of hares, stoats, hedgehogs, foxes from the British Isles, in part collected by himself.

REPORT ON THE BIRDS

By James L. Peters

The Bird Department has suffered a loss in the death of Frederic Hedge Kennard, Associate in Ornithology. He gave the Museum his fine collection of North American birds ten years ago and has taken much interest and devoted much of his time and energy to the welfare of the Department.

The fiscal year just closed has been one of the most noteworthy for a long time, both in the number of accessions and in the greatly increased storage space now available; in fact the tenor of this report on the state of the Department will be entirely the opposite of that noted in the 1935–36 report. In the latter report I pointed out that all large private bird collections that were destined for the museum had been received and that further additions from this source could no longer be expected. Before this report appeared, however, the Director received a letter from Mr. T. T. McCabe, '12 of Berkeley, California, offering to present his collection of birds, chiefly from British Columbia, to the Museum of Comparative Zoölogy as a memorial to his wife's mother, Elizabeth Quincy Bolles (Mrs. Frank). Mr. McCabe's generous offer, subject to certain very reasonable conditions, was gratefully accepted.

The total accessions for the year amount to 6781 skins, of these 4564 comprise the McCabe collection and the remaining 2217 were received from the following sources. Gift, 211, exchange 592, purchase 1148, museum expedition 263.

Dr. Barbour presented a collection of 119 birds made in northwestern India by Dr. Salim Ali, a series of Grouse, Ptarmigam, Partridges, Blackgame and Woodcock shot by himself in Scotland and a number of rare Fijian birds; Dr. J. Delacour of Chateau de Clères, France, presented 17 skins of Pittas and Timalines from Indo-China. Small lots or single specimens were received from the National Museum of Canada, J. A. Griswold, Jr., Compte Rene d'Abadie, J. L. Peters, J. A. Hagar, Boston Society of Natural History, Karl Curtiss and the Marquess Hachisuka. The largest

single purchases were a collection of 444 skins made by W. W. Brown in the mountains of Guerrero, 293 from Sumatra collected by J. F. Menden, 186 skins of French birds and 110 birds selected from a collection made in Honduras by C. F. Underwood. The Sumatra collection alone contained 40 forms not previously represented in the Museum of Comparative Zoölogy.

Two genera new to the collection, Megalurulus and Fregilupus, were obtained by exchange with European museums.

A small grant made to Miss Barbara Lawrence on the eve of her departure for the Philippine Islands enabled her to employ native collectors to supplement her own efforts, with the result that 263 specimens of birds have been received from her Philippine expedition during the period covered by this report.

The generic desiderata, based on Sharpe's Handlist, were reduced by two, as noted above, and the specific desiderata, on the same basis, were reduced by 85. Thirty-five distinct loans were made to eighteen institutions or individuals; the total number of specimens sent out on these loans amounted to 483 skins.

Mr. Greenway, with Mr. Griscom, completed the work on the Amazonian collection and in addition to his investigations into extinct species, which has involved a large amount of correspondence, is engaged in working up a collection of birds from the Brazilian states of Goyas and Minas Geraes. Miss Porter has continued to enter birds in the card catalogue, does all the accession work and some of the rearranging; a large amount of the exchange material was picked out by her. Mr. Griswold is in the field with the Asiatic Primate Expedition, leaving Cambridge about the first of the year. Miss Dorothy Powning joined the staff as a volunteer assistant on March 1st and has been of great help in carrying out the program of expansion and rearrangement described beyond.

My own work has consisted in the usual curatorial and bibliographic work, preparation of "lead cards" for the card catalogue and the prosecution of "Check-List of Birds of the World."

The total number of birds now entered in the card catalogue is 107,177, representing a gain of 4311 over the number on the cards at last report.

The McCabe Collection is temporarily installed in some old type wall cases in room 501; the work of unpacking and arranging it was

satisfactorily accomplished by two student volunteers, David E. Davis and Garrett Eddy to whom thanks are due. Mr. Davis also rearranged the shore-birds and rails to conform with the latest classification.

Late in the autumn a new unit, comprising 20 sections of largest tray size was constructed in room 507. This necessitated moving the Kennard Collection into the hallway. As a first step toward unifying the several separate collections, the gulls and auks from the Batchelder, Bent, Kennard and Thayer collections were catalogued and carded and merged with those of the general collection and occupy 13 sections of the new unit. Into the space in the general collection, vacated by the gulls and auks, the loons, grebes, Procellariiformes and Steganopodes of the general collection were expanded, together with the same groups of the Batchelder Bent, Kennard and Thayer collections. Space is now, or shortly will be, available for the consolidation of the Gallinaceous birds, pigeons, shore birds and herons, so at least satisfactory progress is being made in the rather long drawn out process of unification. This work can only be done family by family as space is available and requires considerable computing of the space to be occupied.

Shortly before the close of the fiscal year a new six unit case to hold the standard small size trays was constructed in room 505. This will absorb the skins now housed in a battery of the old fashioned "Cambridge cans" in that room and it is hoped will also be adequate to receive the Old World flycatchers from room 506, thus providing expansion space in the latter room for the badly overcrowded thrushes and Timalines.

Three cotypes that had been previously overlooked were at last recognized as such and properly marked; in addition forty new forms based on material in the Museum of Comparative Zoölogy were described. In 1930 the Museum published Outram Bangs' "Types of Birds now in the Museum of Comparative Zoölogy," listing the 1241 types then in the collection. So many more new forms have been described since the appearance of Bangs's list that the department has in mind preparing a supplement to bring it up to date and at the same time preparing a full bibliography of Bangs's publications.

Indulging in day dreams is perhaps rather futile but there are

many times that I plan what the department could do with an extra income, say of $3000–$5000 per year for a period of three years. It would enable us to take the entire output of certain reliable resident professional collectors whose services are at present available. These men, located in India, the East Indies and South West Africa are in just the regions from which the collection is weakest. With the larger of the two sums the Museum would also be able to place a modest expedition in the field in another region whence a good representation is still desirable, and could take advantage of the opportunity to secure important collections that might be offered.

REPORT ON THE BIRDS NESTS AND EGGS

By Richard C. Harlow

My work during the year has been largely of a routine nature, making sure that the collection was free from mould and from insect pests. I have not yet really had time to become fully acquainted with all the treasures which it contains but while North American material forms the most important and valuable part of the whole, nevertheless, there are many specimens from all parts of the world and many from old collections made by Audubon, Agassiz and Brewer among many of the early authorities. Some exchanges are in process of negotiation and a few duplicates have been disposed of to provide funds for additional storage cases.

REPORT ON THE MOLLUSKS

By William J. Clench

Expeditions: The Survey of the Bahama Islands was continued during the past year by two expeditions. The first, to Long Island, under the leadership of Mr. Henry D. Russell, was undertaken during July and August. He was accompanied by Mr. Richard A. McLean and Mr. John H. Huntington. A very complete study was made of this little known locality, and large collections of mollusks obtained including many new forms. The second expedition, during December, was made by Emanuel Williams, a native of Cat Island in the Bahamas, who had been our field man during three past expeditions. He visited the little known island of Mariguana in the southeastern part of the Bahama Archipelago and collected a large series of Cerions, one of the most important and widely distributed genera of land mollusks in these islands. Both of these expeditions were made possible through the generosity of several friends of the Museum who have, as in the past, contributed most liberally to its financial support. In addition, the Academy of Natural Sciences of Philadelphia shared a portion of the expenses for a duplicate series of the material collected.

Doctor Joseph Bequaert, on an expedition for the Rockefeller Foundation, spent the months of July, August and September in Colombia where he obtained a series of the land and freshwater mollusks. In addition to the shells collected, Doctor Bequaert received as a gift a small collection of Colombian material from Brother Apolinar Maria of the Collegio de La Salle in Bogotá.

Collections: The Museum has been exceedingly fortunate the past year in acquiring two large collections as gifts. The W. N. Souther collection, which had been brought together over a period of many years both by exchange and collecting, was presented by the executors of his estate. It is particularly rich in marine shells of Puget Sound, collected by Mr. Souther.

Through the kindness of Dr. F. M. Gaige, Director of the Museum of Zoölogy, University of Michigan and Mr. Clavin Good-

rich, Curator of Mollusks in the same institution, a very large and valuable series of their duplicates was presented to us. Much of this material, collected many years ago, is from localities no longer available for collecting. This is particularly true for the freshwater shells which came from streams that are now polluted by sewerage and factory waste.

General: Gifts of small lots of shells have been particularly numerous this past year. Our exchanges, as well, have been very advantageous and have resulted in adding many species new to the collections.

Doctor Bequaert and I have continued our studies of African mollusks and have published several papers on the material in the collection as well as on material loaned by other institutions. We have also started to revise the entire South American series of mollusks and to date most of the large genera of land shells have been completed and geographically indexed.

Mr. McLean has revised many more genera of marine bivalves, and has completed a monograph of the Cardiidae of the Western Atlantic.

My own studies have continued on the Bahama land mollusks, completing a revision of our collections from these islands this year, with a paper now in press and another in preparation.

Mr. P. Culver and Mr. R. Barker, our student assistants, rendered very satisfactory work during the college year and have aided materially in carrying on the general routine curatorial work.

As in the past few years, we are greatly indebted to A. Cheever and R. Foster for their voluntary assistance. Mr. Morris Eglichen joined our staff this past winter as a voluntary worker and has rendered a great deal of valuable curatorial work, sorting and labeling most of the specimens collected on the past two trips to the Bahamas. The incorporation of most of this material into the main collection within the past year would have been impossible without his assistance in this task. Mr. H. D. Russell has continued to devote a day each week, determining the Bahama marine gastropods and other similar material from the western Atlantic. His work has made our east coast collection one of the largest in existence in carefully determined species.

The services of Miss Chippendale were lost this past April when

she left to get married. During the five years she was with the department, as part time cataloguer, she rendered a vast amount of careful and painstaking work.

It is not only in growth, but the development of the material on hand, particularly during the past few years, that is exceedingly gratifying to us. Far more use is now made of the collection, not only in a comparative way, but in studies of geographical distribution, variation, statistical work and faunistic problems. Specimens with full field data do not remain inert in the cabinets but are drawn upon constantly to answer some question in a given problem.

A resumé of the collection follows:

Number of accessions for the year	9074
Catalogued entries in the collection	105969
Number of species in the collection	24337

REPORT OF THE RESEARCH CURATOR OF ZOOLOGY

By Ludlow Griscom

The financial year of the Museum showed a still further improvement as regards the amount of deficit incurred. Increased gifts from outside sources made possible a further saving of unrestricted funds and continued experience decreased expenditure in certain sections of the budget under supplies and equipment.

One of the drawbacks of too long continued economy is the accumulated cost of what in reality are necessities left undone. The past year saw the Museum really faced with this problem for the first time. For years our binding allowance has been a relatively nominal, actually a ridiculously low figure, adequate for a year's accretion of about half of our scientific and technical journals only. We now face a really large sum for binding and repair work. Permission was granted to double the annual budget figure, hereafter, and to use for a Special Binding Fund whatever we could save under the deficit allowed. It is gratifying to be able to report that at the close of the fiscal year, $4000.00 could be set aside for binding purposes, while another $1200.00 was turned back to the University. The new fiscal year will start with approximately the same balances in our two special funds as in the year just ended.

Sales of publications were normal. No purchasers appeared for long runs of either the Memoir or Bulletin series.

No Memoir was published during the current year, but 14 Bulletin articles, totalling 900 pages were issued. By a curious combination of circumstances it was necessary to start running no less than four volumes concurrently. Vol. 79 was reserved for the reports on Mr. Loveridge's last African expedition; Vol. 80 began the previous year with articles delayed by the preparation of the Alcyonarian memoir; Vol. 81 had to begin with a very long paper, while Vol. 82, No. 1 was a rush proposition during the paging of articles in the other three volumes. These latter, however, will all be concluded next year.

The chief research work of the year was the examination of the

great Klages collection of Amazonian birds at Pittsburg with Mr. Greenway, the authorities of the Carnegie Museum having most kindly permitted us to do so, and to include all the data and records of interest in our Amazonian report. Many new subspecies were discovered, and we were allowed to describe those represented in this Museum's collection, while Mr. Todd, the Curator of Birds at Pittsburg, will describe the balance. Our original list was based on some 4000 specimens from lower Amazonia. At Pittsburg we examined 7300 more, and another 10,000 specimens from adjacent areas. Some 9 genera and 69 species will be added to the known avifauna of the lower Amazon. The inclusion of this tremendous mass of material will involve a lengthy revision of our report, but the extra labor involved and the delay will have been amply worth while.

In August I joined Professor Fernald in another of his botanical explorations of south central Virginia. The results were highly gratifying in the number of range extensions and novelties secured and publication by Professor Fernald of the more important discoveries has just commenced. In March and April I visited the Lesser Antilles, Trinidad and British Guiana, where I happily hunted hoatzins with Mr. Peberdy, the enthusiastic curator of the Georgetown Museum. Active local field work continued as usual.

REPORT ON THE REPTILES AND AMPHIBIANS

By A. Loveridge

As might be anticipated, if one maintains a conservative attitude as to what constitutes a species, each succeeding year it becomes increasingly difficult to add to the number of species in the collection. The gain during the past year has been 57 as against 91 for the year 1935–1936. Exchanges now constitute the principal means of obtaining the desiderata necessary to augment the collection; relatively few old world museums realize, however, the mutually advantageous benefits resulting from exchanges and in consequence considerable effort has been expended in preparing proposals with inadequate results. Only 286 additions resulted from exchanges arranged with fifteen institutions but they were well worth while as coming from regions inadequately represented in the departmental collections.

A considerable amount of time was occupied in the proof reading of papers (totaling nearly 800 pages) whose titles are listed in this report. The concluding summary of my 1933–1934 journey was written and is now in press.

Mr. Benjamin Shreve has continued his research work on new world herpetology, identified a wealth of amphibian material from the Bahamas and Cuba and, in conjunction with the Director, described a number of new species and races from these regions. In addition he has given generously of his time in helping me with routine work connected with the care of the collection.

The most important entry resulting from Museum Expeditions was that of 367 specimens collected in Cuba by Dr. P. J. Darlington. Actually many more were obtained, but the series being long, duplicates were donated to several other museums where it was felt that they would serve a useful purpose. Dr. Darlington's discriminating collecting invariably results in the acquisition of new and interesting forms, in this instance the half-dozen novelties have formed the subject of a paper by Dr. Barbour and Mr. Benjamin Shreve. Other collections by members of the staff in the field only totaled 80 during the past year.

A collection of 64 specimens collected by W. W. Brown in Mexico; 120 sent in by Dr. H. C. Clark from Panama; 539 taken by Mr. J. H. Power in Pondoland; a score contributed by W. Hoesch of South West Africa; together with 96 from various other sources, were presented by a friend of the department.

Fifteen individuals gave smaller lots. We take this opportunity of expressing our appreciation for these welcome gifts to Drs. J. Bequaert and A. M. Boring, also Messrs J. A. Cheever, C. W. Dodge, D. H. Dunkle, A. G. B. Fairchild, J. Graham, C. J. van der Horst, G. Kennedy, G. Nelson, A. Northrup, R. E. Stadleman, L. A. Walford, N. A. Weber, and last, but by no means least, to Mr. W. F. Walker for 46 Peruvian snakes which have formed the basis of some taxonomic studies that he has been carrying on at the museum.

Thirty-nine loans were made to 14 persons representing 11 institutions. Most of these loans consisted of groups of specimens, several numbered over 50 individuals. While most of our correspondents returned the borrowed material with reasonable promptitude, some have had to be approached again and again with reminders that their loans were long overdue.

The annual census of the collection follows:

	Genera	*Species*	*Gain Genera*	*Gain Species*
Rhynchocephalis	1	1	0	0
Crocodilia	8	24	0	0
Chelonia	61	212	0	8
Lacertilia	289	2,172	0	24
Ophidia	305	1,508	0	3
Amphibia	222	1,571	0	22
Totals	886	5,488	0	57

REPORT ON INVERTEBRATE PALAEONTOLOGY

By Percy E. Raymond

The Curator devoted nearly all his time during the year to finishing a book which has been in preparation for several years. Mr. Schevill continued his rearrangement of the Hyatt collection of fossil cephalopods, in such time as was not occupied by his work in the library.

Specimens belonging to the Museum were described in several articles which appeared during the year. Noteworthy among them were the papers by Dr. L. W. Stephenson and Dr. Roy S. Bassler on the Cretaceous fossils collected by Mr. Stetson from the canyons off Georges Bank; one by Dr. Valdimir J. Okulitch, and another by Okulitch and Dr. Claude Albritton on corals, and one by Dr. J. Brookes Knight on the peculiar organism Conchopeltis. As usual fossils have also been loaned to several other people for study during the year.

Field work has been confined to two short trips by the Curator to Pennsylvania, where collections were made from the Upper Ordovician.

Our thanks are due to Mr. Frank Thompson for his continued generosity, his outstanding gifts during the year being a fine slab of crinoids and beautifully preserved specimens of Carboniferous crustaceans, enrypterids, and diplopods. Dr. Fred B Phleger presented the fossils collected by him in Europe while holding a Sheldon Travelling Fellowship.

A few additional specimens of molluscs were brought out from the Boston Society of Natural History, including one of Hyatt's types of *Placenticeras whitfieldi.* These specimens were not brought out with the main lot some years ago, as the Society had asked to retain them until the reorganization of its Museum, now in process.

REPORT ON VERTEBRATE PALAEONTOLOGY

By A. S. Romer

The field of reptile and amphibian palaeontology has been that in which the greatest advances have been made during the past year. A major event was the completion of the collecting work in the Triassic beds of Southern Brazil undertaken by Dr. T. E. White and Mr. L. I. Price through a grant from the Milton Fund, as noted in last years report. Seven tons of reptilian material was brought back including some 31 skeletons 26 additional skulls and numerous interesting although less complete remains. A large proportion of the remains consist of Rhychosaurs with dicynodonts a close second in numbers; cynodonts and various archosaurs constitute the remainder of the finds. At the present time the various blocks are being opened for a survey of the collection as a whole, and two of the best rhynchosaur skulls are being prepared. A further grant from the Milton Fund for the next two years will, we hope, enable us to prepare a large proportion of the material and render it available for study. These specimens constitute the finest collection yet made representing the South American Triassic vertebrate fauna.

As was noted in the last report, the expedition was received throughout the trip with the greatest cordiality. Our special thanks are due to the following for their aid: Dr. P. Campos Porto, Director do Conselho de Fiscalização das Expedições Artisticas e Scientificas no Brasil; Dr. Euzebio de Oliveira, Director do Serviço Geologico e Mineralogico; Dr. Djalma Guimarães, Director do Serviço de Fomento da Produção Mineral; Dr. Mathias de Oliveira Roxo, Director da Secção de Paleontologia do Serviço Geologico; Dr. Axil Löfgren, Paleontologist, Serviço Geologico e Mineralogico; Dr. Joao Dahne, Director da Secção de Geologia do Estado do Rio Grande do Sul; Dr. Leovegildo Paiva, Director do Porto de Porto Alegre; Dr. Alfons Niedermeier, Engineer at Santa Cruz, Rio Grande do Sul, and particularly to Mr. R. S. Castleman, U. S. Consul at Porto Alegre.

Further reptilian collections have been obtained from our own Western States. As noted last year, Mr. Witter spent most of the summer of 1936 in the Texas Redbeds, accompanied by H. G. Sawin and D. H. Dunkle of the Graduate School and Mr. James L. Moore, Jr. of Moorestown, N. J. A great deal of excellent material was obtained. Outstanding was the discovery of a skeleton of a small *Dimetrodon* which is perhaps the most perfect Permian reptilian skeleton ever obtained including articulated feet and a tail complete to the very tip. A large series of skulls of small amphibians will, we expect, prove exceedingly valuable when developed.

Later in the summer Witter was fortunate enough to discover a "pocket" in the Triassic of New Mexico from which were obtained some 9 skulls of large labyrinthodonts, as well as a considerable amount of postcranial skeletal material.

During the past spring Mr. Price made a short visit to the Texas beds. He obtained a number of valuable finds such as a skeleton including a perfect articulated vertebral column of the large amphibian Eryops, skeletons of Trimerorhachis and Ophiodeirus and skulls of the last and of Trematops. This trip was rendered possible through a grant from the Marsh Fund of the National Academy of Science.

A new series of reptilian panel mounts by Mr. Nelson has been initiated by the completion in the summer of 1936 of a mount of the longspined pelycosaur *Dimetrodon limbatus*. As this report is written he has practically completed the mounting of a second pelycosaur, *Edaphosaurus* (*"Naosaurus"*) *cruciger*, the "ship-lizard." This latter skeleton is, I think, the best pelycosaur mount in existence. It is hoped that these may be followed by other pelycosaur skeletons, the material of which is already in hand.

The curator has nearly completed a monograph on the pelycosaurs, the primitive mamal-like reptiles of the Permocarboniferous redbeds. Much of the work is based on the recent collections of this Museum, which, except perhaps for those of the University of Chicago, constitute the most valuable morphological materials of vertebrates of this age.

Dr. White has finished his work on the Seymouria skull and is now engaged in study of the post-cranial skeleton.

In the field of fossil fishes, additions to our Triassic materials

have been made as a result of two short trips to the fish-bearing beds of Durham, Connecticut, and one to Sunderland, Mass.

The curator has completed a study of the braincase of the crossopterygian Megalichthys based upon our recent Texas collections, and further studies of the morphology of this form, partly in collaboration with Dr. R. T. Eaton, Jr., are in progress. Mr. D. H. Dunkle is studying a number of our actinopterygians.

In the summer of 1936 Mr. Henry Seton, accompanied by Mr. Robert Denison, undertook the exploration a series of Eocene mammal-bearing beds in the Wind River region of Wyoming discovered by the former in the previous year. Unfortunately Mr. Seton was taken ill in mid-season and forced to return. Despite this an interesting series of specimens, particularly of Creodonts and Mesohippus, were obtained.

The Coryphodon skeleton mentioned in earlier reports is a remarkably complete one but almost every bone was crushed flat during its long Tertiary entombment, rendering its preparation for exhibition a major task. Mr. Nelson however has achieved the very difficult feat of restoring the completely flattened skull to its natural contours, and it is hoped that another year will see the skeleton on exhibition.

We have been happy in having had numerous scientific visitors during the past year. Dr. Robert Broom of the Transvall Museum was our guest for a week in March, and Prof. D. M. S. Watson and Dr. T. S. Westoll of University College, London, and Mr. W. Graham-Smith of Cambridge University visited us in April, Dr. Westoll finding many fishes of interest to him in our Paleozoic collections. Dr. T. H. Eaton, Jr. of Union College and Dr. R. Zangerl of the University of Zurich have spent the summer in the vertebrate laboratory.

Mr. Henry Seton, who has been associated informally with the department for a number of years has been appointed Research Associate.

A considerable amount of new equipment has been added in the basement laboratory which will enable us better to cope with the work of preparation of the South American material. Needed storage space has been obtained by building racks in the "Rogers room," and the South American collection has been temporarily stored in the former entomological rooms.

REPORT ON THE FOSSIL ECHINODERMS

By Robert T. Jackson

Much time was spent in labelling and cataloguing the fossil Echini.

There were received from Mr. W. E. Schevill two fine specimens of the very small crinoid, *Allegecrinus strimplei* Kirk from the Dewey Limestone, Carboniferous, of Dewey, Oklahoma. Also there was received as a gift an exceptionally well preserved specimen of *Leiocidaris hemigramosus* (Shumard) from the cretaceous of Texas, collected by J. B. Litsey.

REPORT ON FOSSIL INSECTS

By F. M. Carpenter

The accession of several thousand Cretaceous insects in Manitoban amber, collected by a Museum party, makes the past year an outstanding one in the history of the fossil insect collection. The curator obtained a grant from the Milton Fund to cover the expenses of the trip, and Professor C. T. Brues, subsequently becoming interested in the undertaking, secured an appropriation from the American Academy of Arts and Sciences. In addition the collecting party consisted of Mrs. Brues, Miss Alice M. Brues, and Mr. C. T. Parsons, a senior in the college. The task of working over the four hundred pounds of amber collected on the trip has only begun, but it is apparent that the collection will fill in a wide gap in our knowledge of the geological history of the insects.

Donated during the year were: from Dr. F. M. Hull, the holotype of a new species of Syrphid fly in Baltic amber; and from Mr. John D. McNeal, a specimen of a new genus of Protodonata from the Carboniferous of Kansas. Purchased accession: a new species of Mecoptera from the Liassic of Hannover.

In addition to the work on the Manitoban amber the Curator has nearly finished an account of eight of the orders of insect secured in 1935 in the Permian of Kansas; and with the collaboration of Dr. C. P. Alexander, Dr. F. M. Hull, Dr. Thomas Snyder, and Mr. Maurice James, has brought to completion the first part of a series of papers on the insect fauna of the Creede shales in Colorado. He has also started on a revision of the Nearctic species of the Neuropterous family Hemerobiidae. Dr. Hull, a graduate student under the Curator, has finished a monograph of the fossil Syrphidae, based mainly on our collections, and collaborated with the Curator on a revision of the fossil Pipunculidae. Mr. Maurice James, of Colorado State College, has named and described our Florissant and Creede Bibionidae, Stratiomyidae, and Asilidae.

Early in the year the exhibit of fossil insects was revised and expanded, in order to include some of the more recently acquired specimens.

The accession of the Cretaceous amber insects fills out the collection of fossil insects in a very satisfactory manner. The Scudder collection of fossil insects, which forms the nucleus of the present collection, consisted of about 20,000 specimens, and additional fossils secured by the Museum before 1925 brought the total to about 22,000 specimens. Since only about 50 Palaeozoic and 500 Mesozoic insects were included, an effort has been made during the past ten years to increase the number of specimens from those two eras. At the present time the collection consists of approximately 50,000 specimens, of which some 8,000 are Palaeozoic and probably as many more are Mesozoic, if our estimation of the number of Cretaceous amber insects is correct.

REPORT ON THE FISHES

By W. C. Schroeder

It is a pleasure to report that the fish collection is now being recatalogued, rearranged and otherwise thoroughly overhauled. Thus far 37 families, comprising 145 genera and 423 species have been completed. In addition much unidentified material has been segregated for future study. However, as this represents scarcely one-twentieth of the collection a considerable amount of work remains to be done.

Entries in the catalogue totalled 465. Some of these represent material received long ago but most of the specimens came in during the present year. Included in the new accessions the following lots were received: Dr. Thomas Barbour 6; Dr. H. L. Clark 1; Messrs. W. J. Clench and W. E. Schevill 3; Mrs. F. I. Emery 1; Mr. James Greenway 1; Mr. J. A. Griswold 2; Mr. Ludlow Griscom 1; Mr. A. Loveridge 2; Mr. George Nelson 3; Dr. J. C. Phillips 1; Mr. A. E. Parr 12; Mr. C. M. Pomerat 1; Mr. W. Regan 2; Mr. W. C. Schroeder 283; Dr. L. A. Walford 1; Dr. John Welsh 3; Woods Hole Oceanographic Institution 4. Exchange material was received from the Academy of Science, Kiew; the Pacific Scientific Fisheries Institution, Vladivostok; the Hopkins Marine Station, Pacific Grove, California, and the Bass Biological Laboratory, Englewood, Florida. A fine specimen of *Chlamydoselachus anguineus* from the Bashford Dean Collection was the gift of the American Museum of Natural History.

Several loans were made during the year including a large collection of Engraulidae to Dr. S. F. Hildebrand of the U. S. Bureau of Fisheries. A collection of 619 lots of Characinidae, most of them from the Thayer Expedition, was sent to Dr. George S. Myers for identification.

REPORT ON COELENTERATES, SPONGES AND WORMS

By Elisabeth Deichmann

The first half year was spent with routine work in the various collections, writing labels, filling alcohol and bringing the nomenclature up to date. Much time was spent in the Echinoderm collections, where quite a number of Holothurians had been gathered during the last few years which needed to be identified. Also some time was spent in assisting Mr. Fred Ziesenhenne from California, who spent almost a year working with Dr. Clark.

A large collection of Echinoderms and Coelenterates were received from the "Zaca" Expedition, from Lower California, and two reports were written by me on the Coelenterates and the Holothurians. The latter report is now in press.

During the year three visits were made to the United States National Museum to study Alcyonarians and Holothurians and make arrangements for exchanges.

In the second half year the Boston Society of Natural History presented their enormous collection of dry sponges to the M. C. Z., mostly shallow water forms from the West Indies. It was a most important addition to the sponge collection here, which practically lacked all the common shore forms, but it took almost the rest of the year to get the collection sorted out and catalogued. The material was exceedingly well labelled, almost all specimens properly tagged with locality and collector's name, so very little had to be discarded on that score. A large portion of the material represents types described by A. Hyatt and is therefore of considerable interest. The unidentified material from the West Indies and West Coast of America has been turned over to Mr. de Laubenfels in Pasadena, who specializes in that region; a number of Indo-Pacific forms have been sent to Dr. M. Burton in the British Museum.

The next question was to find a place to store this enormous collection permanently, but luckily the arrival of the sponges coincided with the transfer of part of the bird collection to some new

modern cases and a number of the old metal cases became available. These are now being stored outside of the coral room and the sponges gradually transferred to their new quarters.

In the basement a number of shelves have been put up to accommodate the larger, bulkier jars, and the collection of sponges in alcohol has been transferred from the fifth floor to this room.

In the synoptic room the labels have now all been written and are in process of being printed. Two typical calcareous sponges have been placed on exhibition.

Aside from the sponge collection there have been very few additions to the collections. Various worms and corals were received from Mr. C. M. Pomerat from the West Indies and Bermuda; Dr. J. Welsh has donated some Actinians on Sargasso weed, collected on the "Atlantis"; the U. S. National Museum has sent 3 lots of Alcyonarians as a gift; a branch covered with Epizoanthus has been received from Mr. H. Armstrong, Pt. Dume, California.

A set of about 40 corals, mostly deep water forms, have been sent to Dr. S. Gardiner, Cambridge, England, in exchange for specimens from the "Murray" Expeditions. Later Dr. Gardiner is turning this collection over to the British Museum.

During the fall Dr. H. Boschma from Leiden, Holland visited the collection and worked on the Fungiidae. A number of photographs of specimens were prepared by Mr. G. Nelson in connection with Dr. Boschma's studies.

REPORT ON THE CRUSTACEA

By Fenner A. Chace, Jr.

Several lengthy interruptions of various sorts have successfully thwarted any attempt at an extensive revision of the collections during the past year. It is a great relief, however, to be able to report that the Brachyura, with the exception of the comparatively small collection of Oxystomata, are now orderly arranged and relabeled throughout so that any particular lot can be readily located without spending hours sorting over unsorted and mislaid material. The crabs, with the exception of the Oxystomes, now number 271 genera and 1024 species. As a start toward sorting and relabeling the Anomura, the Galatheidae and more than half of the Porcellanidae have been relabeled and catalogued. There are at present 89 species of Galatheidae in the collection, of which 48 belong to the genus *Munidopsis*. It was gratifying to find that of these 48 species no less than 37 are represented by type material.

In addition to the cataloguing and relabeling, all of the bottles of Natantia and the lower forms as well as the unsorted and unidentified material have been filled with fresh alcohol thanks to the services of an able student assistant.

Ten days during the early part of September were spent on "Atlantis" of the Woods Hole Oceanographic Institution townetting and trawling on either side of the Gulf Stream and during the latter part of July two weeks were spent at Woods Hole sorting material that was collected by "Atlantis" earlier in July.

Much of the remainder of my time this year has been given to working up two rather sizeable collections of prawns; the Acanthephyridae of the Bingham Oceanographic Collections and the Caridea collected by the Templeton Crocker Expedition in the Gulf of California.

A total of 1315 specimens of Crustacea have been accessioned during the year. A small portion of these was received as a result of exchanges, but that means of obtaining desirable material has not yet attained the importance I hope it will have in the near

future. Lists have been made of all duplicate lots of catalogued and relabeled specimens in the collections to send to other institutions in the hope that they may lead to more extensive exchanges. Worthy of special mention among the accessions are welcome series from Pacific Grove, California, from Dr. H. L. Clark and Dr. E. Deichmann, some choice specimens from the Harvard Bahama Expedition, a very nice lot collected in Cuba by Dr. L. Howell Rivero, a small but valuable Philippine series from Mr. P. de Mesa, several types and other specimens new to our collections from the Templeton Crocker Expedition to the Gulf of California, a good set from Charlotte Harbor, Florida, from Mr. S. Springer and two large collections of unusual specimens collected at Biscayne Bay, Florida, by Dr. H. L. Clark and Dr. J. F. W. Pearson. Other donors to whom thanks are given for less extensive collections are: Dr. H. Boschma, Mr. S. A. Glassell, Dr. L. H. Kleinholz, Mr. J. W. Lowes, Mr. J. E. Pietroski, Mr. R. Rhoades and Mr. W. C. Schroeder. Arrangements have been made with the Woods Hole Oceanographic Institution whereby the Crustacea collected by "Atlantis" are eventually to be deposited in our collections and it is expected that this plan will greatly increase our accessions in years to come.

REPORT ON THE LIBRARY

By Eleanor S. Peters

Quite the largest undertaking in several years was begun in February, when funds were promised for binding all the unbound serials in the library. It is expected that this may take at least two years to complete; in the seven months since the work was started, 1003 books have been bound.

It is to be regretted that we could not have extra help for this binding, for the preparation of volumes for the binder takes one person's full time, to say nothing of the checking over of the volumes when they are returned to us, the writing of bookplates, etc. Miss Howes worked steadily on these details of binding from the first of February until she left in May. As she had been doing most of the cataloguing previously, this part of our routine work is considerably behind and for the last six months the only cataloguing done is what I myself have found time for. Many books and several hundreds of pamphlets have accumulated in this time and await cataloguing and accessioning. As our annual count covers only such material as is really available for use, our figures for the year's increase are considerably smaller than usual.

Mr. Schevill, as Associate Librarian, has spent most of his time in overseeing the work on binding; he has continued with the revision of the Museum's exchange list, and still more of this remains to be done. In connection with both pieces of work he has written many letters for missing parts of volumes, title pages, etc.

The daily accessions continue to take practically all of Miss Hamilton's time. While Miss Howes has been working on volumes for binding, Miss Hamilton has done most of the reference work and all of the daily tabulation of books loaned and returned, etc.

The student helper assigned to the library, Mr. Harold Golden, has proved most helpful in moving books to make space here and there, shelf-listing, collating daily accessions, returning books to the shelves, and other parts of the regular routine.

Some sixty old and valuable volumes, published mostly before

1700, have been taken from the open shelves and put into the locked cases. These books in locked cases are less accessible and safer in that respect — but it should be remembered that these cases are not fire-proof. I hope that they can be replaced soon by cases which will afford proper protection.

In May, Miss Howes was forced by duties at home to give up her work in the library. She came to us in 1928 and has been a devoted and conscientious worker.

Total circulation for the year (August 1, 1936 to July 31, 1937) is 5225; the museum staff borrowed 1151, students and professors 4018 and other libraries 56. While the number of volumes reserved for certain courses in the reading periods was slightly smaller than in the last two or three years, they were in more active use by more students.

Accessions for the year were 1088 volumes and 1298 pamphlets. Taking into account the 331 volumes and 113 pamphlets transferred to other libraries in the University, returned to the Surgeon-General's Library in Washington, or put into our own collection of duplicates, the present total is 78,274 volumes and 97,911 pamphlets.

Mrs. Peters retired June 30, after 21 years of devoted and productive work in the library. Her absence will be keenly felt.

Two new assistants have joined the staff: Mrs. Margaret Frazier and Miss Marguerite Harding, who began work in late May and July 1 respectively.

W. E. Schevill,
Librarian.

PUBLICATIONS FOR THE YEAR 1936–1937

(1 August, 1936—31 July, 1937)

Museum of Comparative Zoölogy

Publications.—The following have been printed during the year.

BULLETIN:—

Vol. LXXIX

No. 5. Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. V. Reptiles. By Arthur Loveridge. 129 pp. 9 pl. November 1936.

No. 6. Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. VI. Nematoda. By J. H. Sandground. 26 pp. 22 text-figs. November 1936.

No. 7. Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. VII. Amphibians. By Arthur Loveridge. 62 pp. 3 pl. December 1936.

Vol. LXXX

No. 2. Ants from Hispaniola and Mona Island. By William Morton Wheeler. 17 pp. September 1936.

No. 3. New Jamaican and Cuban Millipeds, with Notes on Several Other Species. By H. F. Loomis. 14 pp. 1 pl. January 1937.

No. 4. A New Tapir from the Lower Miocene of Wyoming. By Erich Maren Schlaikjer. 21 pp. 5 text figs. January 1937.

No. 5. A Study of Parahippus wyomingensis and a Discussion of the Phylogeny of the Genus. By Erich Maren Schlaikjer. 26 pp. 1 pl. January 1937.

No. 6. The West Indian Species of Osorius (Coleoptera: Staphylinidae). By P. J. Darlington, Jr. 19 pp. June 1937.

No. 7. Notes on Some Species of Drawida and Pheretima with Descriptions of Three New Species of Pheretima. By G. E. Gates. 31 pp. June 1937.

No. 8. The Genus Pheretima in North America. By G. E. Gates. 35 pp. July 1937.

Vol. LXXXI

No. 1. Notes on the Ornithology of Tropical East Africa. By Herbert Friedman and Arthur Loveridge. 413 pp. April 1937.

No. 2. Critical Notes on New Neotropical Birds. By Ludlow Griscom and James C. Greenway, Jr. 21 pp. May 1937.

No. 3. Ants Mostly from the Mountains of Cuba. By William Morton Wheeler. 25 pp. May 1937.

Vol. LXXXII

No. 1. The Braincase of the Carboniferous Crossopterygian Megalichthys nitidus. By Alfred S. Romer. 73 pp. April 1937.

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